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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of

Closed Captioning Requirements for
Digital Television Receivers

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ET Docket No. 99-254

REPLY COMMENTS OF
THE WGBH EDUCATIONAL FOUNDATION
IN THE NOTICE OF PROPOSED RULEMAKING REGARDING
CLOSED CAPTIONING REQUIREMENTS FOR
DIGITAL TELEVISION RECEIVERS

Filed: November 15, 1999

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SUMMARY

The WGBH Educational Foundation and its Media Access division (WGBH) offers the following reply comments to the Federal Communications Commission regarding its Notice of Proposed Rule Making in the Matter of Closed Captioning Requirements for Digital Television Receivers (the "Notice").¹ Definitions and clarifications are needed to assure that all parties are discussing the same issues with the same understanding and are therefore offered below.

In addition, these reply comments discuss and attempt to offer practical solutions and compromises regarding programming issues, levels of service, screen size, application of these rules to a defined set of hardware, cost issues and effective date of rules. We welcome this opportunity to assist the Commission in its rulemaking process.

GENERAL COMMENTS

A focus and common definitions are needed in order to properly address the specific issues raised in the Notice. Certain issues outside of the Notice's inquiry have been raised in various initial comments and may require further action by industry standards organizations or the Commission through other proceedings.

But an agreed-upon adoption of technical standards for the display of closed captions on digital television (DTV) receivers and other consumer equipment is of critical importance to manufacturers, caption service providers, broadcasters

¹ *Notice of Proposed Rulemaking*, FCC 99-180, July 15, 1999.

and, most important, consumers. Decisions regarding receiver implementation must be made with no further delay so that additional determinations can be made about closed caption authoring and transmission and the requirements under the Access to Video Programming rules section of the Telecommunications Act of 1996.

These reply comments further address the issues and questions posed by the Commission in its Notice and reply to various issues brought up in the comments of other parties.

In the instant proceeding, the Commission:

1. needs to define a common feature set for the development of DTV closed caption authoring and decoding, and
2. needs to guarantee that those features will be available in all DTV receiving devices in a timely manner.

Definition of Terms

In light of the previous comments filed, it appears that there is some confusion concerning the nature and intent of the EIA-708B standard, which was carefully constructed to maintain the current levels of caption services and to provide a bridge to an advanced feature set of DTV captions. Since commenters used similar terms with different and sometimes conflicting meanings, the following definitions and clarifications are offered in the interest of clarity and consistency:

1. Native 608 captions
2. Transcoded 608 captions
3. Upconverted 608 captions
4. Native 708 captions
5. Dual-mode receivers

1. EIA-608 ("Native 608") closed captions are captions formatted and presented in the current analog television system and carried on the two fields of line 21 of the vertical blanking interval. Field one contains CC1, CC2, T1 and T2 (the latter being text services). Field 2 contains CC3, CC4, T3 and T4. CC1 is most often used to carry verbatim English captions and CC3 is increasingly being used for Spanish-language captions and captions edited for young children ("Easy Reader" or "Beginning Reader" captions). The common look and feel of native 608 captions is limited to white block letters within a box-like black background field. Color (non-white) characters, while possible, are only occasionally used due to the 13-year legacy (1980-1993) of set-top decoders which cannot display colored captions.

2. EIA-708B is the standard for conveying caption data in a digital television signal and provides a method to include 608 caption data ("transcoded 608"). Since the DTV signal does not have a vertical blanking interval, EIA-708B provides an alternate method of maintaining existing captioned programming services by allowing for the inclusion of native 608 caption data directly in the digital bitstream. This method provides a solution to the concern about having

to recaption all analog (NTSC) programming destined for conversion for DTV distribution.

"Transcoded" 608 data is intended to be delivered to a conventional EIA-608 caption decoder, either within a DTV receiver device, or through its analog video output to a conventional television and its built-in EIA-608 caption decoder circuitry. "Transcoded" 608 captions presented in this fashion look and perform identically to traditional analog captions ("Native 608").

3. It is also possible to "upconvert" 608 caption data to true 708 format, in effect using the original 608 data as source material and employing a limited set of EIA-708 features to present the captions to an EIA-708B decoder. These "upconverted 608" captions also maintain the look and feel of traditional analog captions, but are presented and decoded using the true digital construct. This up-conversion occurs at the origination point of a video program's distribution, not in any form of digital set-top box or receiver.

Typically, both transcoding and upconverting are performed by a "caption data server," a device suggested in the EIA-708B specification and now commonly available and being used on the air by approximately two dozen DTV stations. This fact contradicts the statement made in the comments of the National Cable Television Association, "... equipment currently does not even exist that is capable of captioning consistent with the standard proposed in the Notice."² A

² NCTA Comments, pg. 5.

caption data server interface format recently adopted by SMPTE standardizes the connection between this device and other DTV encoding equipment.³

In reading certain comments to the Notice, it became apparent that there is a misunderstanding regarding the potential effect if the Commission mandates any features beyond those delineated in EIA-708B, Section 9. In fact, the DTV feature set to be determined under this Rulemaking will apply to consumer equipment only and will not govern the type or level or feature set that video program providers deliver under the Telecommunications Act requirements for Accessible Video Programming. Upconverted 608 captions are available and are being used today for DTV programming and will meet the requirements of the Telecommunications Act. Upconversion is a near automatic process with minimal costs.

4. The EIA-708 standard also allows for considerably more bandwidth to accommodate new caption features and services – "native 708" captions – that will require a new generation of (708) caption decoders as well as new caption authoring tools and upgrades of existing authoring software. This proceeding will determine which of the advanced features described in EIA-708B will become the basic feature set supported by DTV receivers and set-top boxes, and therefore the extent to which caption services will be allowed to improve.

5. Dual-mode receivers are actually just now becoming available to consumers. First generation DTV receivers were typically set-top boxes with single ATSC

³ SMPTE 333M.

(digital) tuners, capable only of receiving new DTV signals. The new devices contain both an NTSC (analog) television tuner and an ATSC (digital) television tuner and can be found as set-top boxes, PC add-on cards and in integrated receivers (tuners bundled with a display screen). Likewise, these devices commonly have multiple video outputs: analog composite, S-Video, digital component (Y, Pr, Pb) and VGA. Consumers need assurance that they will have access to captioning no matter which tuner is selected for display, via any of the outputs the device offers.

Programming

In its comments, the National Association of Broadcasters (NAB)⁴ states that the proposed rules concerning digital television captioned programming will create a "significant burden" by forcing the creation of "two different captioning works." This seems to be a misreading of the intent of the Notice in that it is nowhere suggested that programs be captioned twice nor would they be required to carry "native 708" caption data. As discussed above, there are technical solutions today that can transcode and upconvert 608 caption data to the 708 format in a single encoding session. Caption providers in a competitive environment will have incentives to support output of multiple caption formats from a single source file. EIA 708B defines how to include 608 data within the 708 transport because manufacturers, broadcasters and caption service providers did not want to have to caption programs twice. It was not expected that DTV receivers

⁴ NAB Comments, Sec. I.

would translate native 608 captions into native 708 captions. Hence the upconversion and "608 in 708" transport solutions.

The Commission clarified⁵ that it intends to declare as subject to the "pre-rule" transition schedule "all digital programming prepared or formatted for reception on digital television receivers prior to the date on which such television receivers must be equipped with decoder circuitry for the display of digital television transmissions," or 75% of non-exempt programming by January 2008. By the same schedule, "new" programming (prepared or formatted after the effective date of the rules stemming from this Notice) would need to meet the 100% requirement by January 2006.

In light of the fact that automatically upconverted 608 data would satisfy these rules, it is reasonable to expect that this schedule can be met. The caption requirements have been in place for more than a year and solutions for efficient caption encoding exist and are on a fast development track for roll-out into the marketplace.

User Control, Levels of Service

Consumer filings in response to this Notice have made it clear that there is strong and consistent support from end users for advanced DTV closed captioning features that allow user control and enhanced "look and feel" of next generation

⁵ Notice, ¶ 4.

captions.⁶ Previous comments by WGBH recommended that the addition of "caption volume control" (user-adjustable character size), pen size, font choice, translucent background and the concurrent availability of at least six standard caption services would advance the captioning service in alignment with the advanced picture and sound of DTV, provide useful tools for caption providers in the creation of new services, and leave many more features for future development and manufacturer differentiation.

Comments from manufacturers⁷ indicated that marketplace demand and consumer response should be the guiding factor in determining which features should be offered in their equipment. Manufacturers also recognize that retrofitting equipment after designs are complete, assembly lines reconfigured and hardware goes into mass production is more expensive and in greater danger of operational flaws than equipment that is designed properly and with all final features included from the start. Perhaps manufacturers can take the consumer input offered in these proceedings as the voice of the eventual marketplace for DTV closed captioning and save themselves significant expense and time by recognizing that consumers have made clear what they desire in their captioning displays. The consumer organizations responding to this Notice accurately represent the true needs and desires of hundreds of thousands if not millions of primary caption users and are an accurate guide to the marketplace.

⁶ Comments of National Association of the Deaf; Telecommunications for the Deaf, Inc.; Self Help for Hard of Hearing People, Inc.; AG Bell Association; and individuals.

⁷ Comments of CEMA at § I, IV; Thomson at § IV; Toshiba at § B.

Minimum Performance Standards and Additional Caption Features

In its comments, CEMA⁸ says that the "Commission should defer to the judgment of manufacturers to determine what additional standards should be implemented." This must be reconciled with comments filed by consumer groups and individuals calling for extending the minimum requirements to allow for greater viewer control over the look and feel of DTV captions.

As WGBH has previously noted, Section 9.2 of EIA-708B represents a step backward from existing caption services in recommending that, "Decoders should be capable of decoding and processing data for at least one (1) service." Existing FCC rules⁹ state that, "The television receiver must decode both C1 and C2 captioning, and must display the captioning for whichever channel the user selects." Certainly CEMA wouldn't recommend a 50% cut in service for DTV captioning when DTV itself represents a major leap forward from NTSC television.

In addition, Section 9.1 of EIA-708B states, in discussing its recommended Pre-Allocated Bandwidth, that, "... the per-service limitation ... still provides a five-fold enhancement over the maximum possible NTSC Closed-Caption service data rate..." With a five-fold enhancement of existing bandwidth, and with today's common decoder implementation offering CC1, CC2, CC3, and CC4, a DTV closed captioning requirement for support of six standard caption services

⁸ Comments of CEMA at § I and II.

⁹ 47CFR15.119

seems more than reasonable, with optional support for dozens of additional services leaving ample room for the product differentiation desired by manufacturers.

Therefore, EIA-708B's Section 9 recommendations must be considered inadequate in preserving levels of caption service available today and in advancing levels of service commensurate with the digital service now emerging.

In order to assure that all required and optional features, when available, are uniformly implemented by all manufacturers, the Commission should incorporate into its rules by reference (for informational purposes only) the entire EIA-708B standard and related documents. Uniform implementation is necessary to assure that caption consumers will have a reliable and consistent service regardless of which make or model of receiving equipment they purchase or are provided by their local cable operator.

Screen size and new dimensions

The existing FTC standard should continue to be used to calculate screen size and the minimum requirements under this Rule. However, it should also be recognized that the comments of Telecommunications for the Deaf and the National Association of the Deaf¹⁰ have merit and should be seriously considered. These comments recommend eliminating the screen-size limitation of the Rule entirely.

¹⁰ TDI Comments at § II; NAD Comments at § III B.

The suggestions of CEMA, Thomson and Toshiba¹¹ calling for a new minimum screen size requirement to be set at 7.8 inches in vertical height (versus 13 inches in diagonal size as the current Rules require) would actually result in raising the analogous screen-size minimum by 20%. On a 16:9 aspect ratio TV display, 7.8 inches in height translates to 16 inches on the diagonal. Though the overall proportions of many (but not all) new digital displays will be changing, the 13 inch rule, which was carefully negotiated during the drafting of the TV Decoder Circuitry Act, will still be relevant to a consumer's ability to view captions and a manufacturer's need to include proper decoding circuitry.

Another view worth considering is that offered by TDI, which argues that the existing 13-inch limit is arbitrary and obsolete considering the improved resolution and legibility provided by new screen technology and digital video distribution.¹² TDI also points to the increasing use of "personal video screens" in places of public accommodation, including hotels, kiosks and airplanes. NAD concurs with this opinion, and suggests new rules apply to televisions of all sizes. We find these positions compelling and worth serious consideration.

Dual Mode Receivers and Primary Caption Decoder Function

We agree with NAB's position¹³ regarding the utilization of analog caption data and urge that any analog NTSC video output of a DTV receiver or set-top box

¹¹ CEMA Comments at Sec. III.; Thomason Comments at pg. 14; Toshiba Comments at ¶ 2A.

¹² TDI Comments at § II.

¹³ NAB Comments at Sec IIA.

should provide properly encoded Line 21 caption data whenever 608 data is present in the original NTSC or ATSC signal. This was the original intent in the design of the EIA-708B specification and does not require any transcoding or up-conversion of caption data by consumer equipment manufacturers and does not impose a burden on them. This is the only way consumers will be assured that existing analog TVs and VCRs will function properly with a new DTV receiver or other reception equipment. Many first-generation DTV receivers have not handled 608 data properly and have poorly served the interests of caption consumers.

It will be the responsibility of video program providers and caption agencies to assure that caption data is properly encoded into ATSC signals, at times redundantly via incorporation of native or transcoded 608 caption data along with native 708 data. Manufacturers will merely need to respond to this data properly, not alter it.

Guidance on this matter may be found in the Commission's Report & Order regarding video programming accessibility mandated under the Telecommunications Act of 1996:¹⁴

"We find it unacceptable that existing captions might fail to be transmitted in a complete and intact manner to consumers. Thus, we will adopt and

¹⁴ REPORT AND ORDER in the Matter of Closed Captioning and Video Description of Video Programming, MM Docket No. 95-176, Implementation of Section 305 of the Telecommunications Act of 1996 - Video Programming Accessibility; Adopted: August 7, 1997; Released: August 22, 1997. ¶ 211.

enforce a rule to ensure that captioned programming is always delivered to viewers complete and intact. This rule, Section 79.1(c), is an extension of the existing provision of the cable rules that requires cable operators to deliver existing captions intact. Accordingly, video programming providers must pass through any captioning they receive that is included with the video programming they distribute as long as the captions do not need to be reformatted. We believe that our enforcement of this new rule and the enforcement of the requirements of Sections 15.119 and 73.682 in conjunction with the mandatory captioning requirements will ensure the technical quality for the closed captioning that is delivered to viewers' television receivers.

We also agree with the NAB that the primary function of an NTSC caption decoder is to decode NTSC (native 608) captions and the primary function of an ATSC caption decoder is to decode ATSC (native 708) captions. When both tuners exist in an integrated receiver (tuner and display in one piece of hardware), there should also be both caption decoders present. The data can take many paths, but if native 708 data is presented in a DTV broadcast, the device should be able to decode and present it to a digital display.

Additional caption decoding features may be offered. For example, a manufacturer may choose to decode the advanced features of 708 captions and present them to an NTSC output on a video overlay, giving a consumer with an older NTSC display the opportunity to watch and enjoy advanced captioning features. CEMA¹⁵ objects to this functionality being required but some manufacturers tell us it is feasible and may indeed be offered. But even when

¹⁵ CEMA Comments at § V.

providing such an option, if 608 caption data is present along with an NTSC video output, those data should be encoded on line 21 of the analog output.

Dual-mode and multi-purpose caption services have been offered by caption agencies and their clients for many years. Beginning in the early 1980s when both line 21 and NABTS teletext caption data were encoded on many CBS programs and network advertisements and continuing today as the CBS programs "60 Minutes" and "60 Minutes II" offer both English and Spanish captions, provision of multiplexed caption data has been taken on by the captioning industry and its clients. WGBH and PBS, too, are about to begin offering multiple caption streams when the popular children's program, "Arthur," begins broadcasting with both verbatim and "Beginning Reader" captions early next year.

Set-Top Boxes

The comments of General Instrument and the NCTA call attention to the important issue of incompatibilities between the digital terrestrial broadcast and the digital cable television standards, variances that range from different encoding and modulation schemes, to differences in handling PSIP, electronic program guides and data, to the controversial issue of digital must carry rules.

These issues need to be resolved and there is significant effort within the industry to do so (including ongoing talks between SMPTE and the NCTA), but it would be inadvisable for the Commission to abandon A/53 and EIA-708B in

favor of a proprietary approach to caption encoding that has little or no support in the broadcast community.

General Instrument comments¹⁶ that EIA-708 is "not at all widely accepted in the video industry" and NCTA suggests¹⁷ the Commission consider not "forging ahead with a new standard." Both of these comments ignore the significant consensus efforts which have taken place in numerous standards committees to draft, to review and to vote to accept work devoted to and based on EIA-708. For more than five years this work has been ongoing by CEMA, SMPTE and the ATSC. In fact, EIA-708 has been formally approved by CEMA on two occasions and appears as a normative reference numerous times in existing SMPTE and ATSC standards, including SMPTE 333M and ATSC A/65 and A/53.

The GI and NCTA suggestion that EIA-708B not be supported is baffling in light of the following excerpt from the OpenCable Set-Top Terminal Functional Requirements document¹⁸ released just two weeks ago on the OpenCable web site (www.opencable.com):

7.2.3 Digital Television (DTV) Closed Captioning

STT-UDI-C-48: All set-top terminals delivered after December 31, 2000 shall process the Digital Television (DTV) Closed Captioning information, when available in the MPEG-2 Picture User Data, as specified in EIA-708B,

¹⁶ GI Comments at footnote 11, page 11.

¹⁷ NCTA Comments at pg. 6.

¹⁸ CFR-OCS-UDC-INT01-991027.

section 9 and delivered according to SCTE-DVS053r6 or SCTE-DVS157r1 on a program-by-program basis.

It seems clear that the cable industry is positioned to support caption data formatted according to EIA-708B, through not one, but two proprietary systems, including one supported by Scientific Atlanta.

The related comments by the NCTA¹⁹ suggesting the Commission "undertake a cost-benefit analysis" would only result in a unproductive and prolonged process that would benefit no one, particularly caption consumers who have already been left out of the opportunities and excitement of the new digital television service. The issues of backward compatibility that NCTA rightly champions have been at the heart of the EIA-708B standard from its inception and will be a burden only to caption agencies, who have already agreed to bear such a responsibility through dual-mode caption preparation through a long transition period.

Jurisdiction

CEMA questions the FCC's authority in governing "all devices capable of receiving DTV transmission,"²⁰ and GI points to an FCC clarification which GI says, "does not afford it jurisdiction over separate decoding devices."²¹ Once again it should be noted that the TV Decoder Circuitry Act states that, "As new

¹⁹ NCTA Comments at pp. 5-7.

²⁰ CEMA Comments at Sec. V.

²¹ GI Comments at footnote 14.

video technology is developed, the Commission shall take such action as the Commission determines appropriate to ensure that closed-captioning service continues to be available to consumers."²² Nothing can be considered "new video technology" more than the giant leap this country is now taking into the future with digital television. This new technology, in many cases, will be accompanied by new means of receiving and displaying pictures and sound, and the Commission is right to propose to modernize its rules protecting deaf and hard-of-hearing viewers by assuring that these new video technologies properly deal with closed caption data.

Regarding the Commission's Clarification cited by GI (concerning computers used as TV receivers)²³, that Clarification did extend the TV Decoder Circuitry Act's oversight to include computer-based TV tuners that were sold "as part of the same business transaction with monitors over 13 inches," thereby indicating that transaction's explicit intention for the equipment package to be used to watch television. And though a petition is still pending before the Commission to further clarify a difficult distinction to enforce, we question whether any such ambiguity of purpose exists for set-top boxes and other devices capable of receiving DTV transmissions. Isn't it abundantly clear what the purpose of these devices is and that, unlike personal computers, set-top boxes and digital converter boxes are key components of a digital television system?

²² 47 USC, p 330(b)

²³ Public Notice 11 FCC Rcd. 4455 (1995).

Cost Issues

When considering costs, it is helpful to focus on the specific issues in this Notice - the technical standards for the display of DTV captions and requirements for inclusion of closed caption decoder circuitry in DTV receivers and related equipment. Unrelated or projected costs of making programming accessible or upgrading cable system infrastructure are important but cloud the issues raised by the Notice.

The DTV standards development process has been on-going for at least the past five years. All of the issues, and the proposed solutions, involved in this Notice have been discussed and developed with the active involvement of every sector of the television industry. Much of the research and development work has already been conducted and related costs should be predictable as the cost of doing business.

Captioned programming requirements have also been in development since the first draft of the Telecommunications Act in 1994, culminating in final rulings more than a year ago. While this Notice is important in determining the effective date of the programming requirements for DTV, there should be no surprise, nor any direct cost relationship, between this technical Notice and the programming transition schedule.

NAB's and HBO's concerns about quality and the potential need to duplicate captions are issues that will be worked out in the marketplace by programmers

and caption agencies. Artistic and technical creativity and innovation will be driven by competition once the technical standards and minimum requirements are set by the Commission. Some video program suppliers and distributors will choose quality, or added features, some will make choices based on cost. Caption service providers will continue to price their services competitively. Like any technology based business, each party will need to make requisite investments in hardware and software upgrades and systems development.

But it is crucial that this Notice establish a broad base of fully featured, reliably functioning DTV caption decoders early on, if producers or consumers ever hope to see improvements or additions to the existing caption service. Reduced mandatory capabilities in the decoding equipment will hold back the development and advancement of DTV captioning more than anything else. Caption service providers have taken on the responsibility of vigilantly protecting installed bases of consumer equipment and as such are always loathe to begin using new caption capabilities until it is reasonable to assume that the vast majority of users won't be damaged by the introduction of new features. If the early dissemination of caption-capable digital TV equipment is required to include only a least common denominator set of caption features, it will be decades before new features will be safely premiered.

It's also important to note that the current state-of-the-art caption decoders are software-based. With common integrated circuit design, and with DTV receivers that incorporate as much data processing power as many personal computers, adding additional caption decoding and encoding capability becomes easier and

cheaper every month. The "small automobile" that Toshiba in its comments²⁴ refers to when discussing VBI encoding circuitry costs must be assumed to be the type of automobile found at Toys 'R' Us.

Effective Date of Rules

Minimum caption display capabilities for DTV equipment should be required as soon as possible.

We disagree with NAB's estimation of the progress within SMPTE to support DTV captioning.²⁵ As mentioned previously, SMPTE 333M supports one method of interfacing caption equipment with other DTV equipment, is currently being supported by most of the major DTV emission encoder manufacturers, and is being used by nearly two dozen DTV stations already on the air.

Additionally, other SMPTE proposals to support captions in the DTV production and distribution chain (through vertical ancillary data and AES-3 audio as well as the distribution packet method) have been in development for more than a year and are currently in ballot form and in the midst of a vote. Major broadcast equipment manufacturers, the national television networks and caption vendors and agencies have developed these proposals and are prepared to implement solutions quickly.

²⁴ Toshiba Comments at § F.

²⁵ NAB Comments at § III.

Over the past year, WGBH's DTV Access Project has been working with the CEMA/MSTV Model HDTV Station Project to support the development of DTV captioning and has created initial test materials and conducted successful interoperability tests with all of the major DTV equipment manufacturers. With industry support and assistance, testing materials will soon be available which will exercise much of the native 708 feature set.

The following phase-in of Rules pursuant to this Notice are pragmatic and achievable:

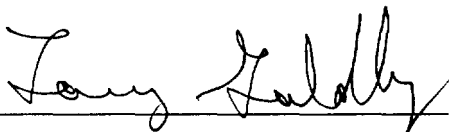
- As soon as possible, all DTV receivers should be required to pass 608 data, when available, encoded on Line 21 through any and all available NTSC video outputs on consumer DTV devices.
- Within one year of establishment of Rules under this Notice, EIA-708B Section 9 functionality should be required.
- Within two years, the additional functionality recommended in WGBH's initial comments should be required.
- Manufacturers should be encouraged to voluntarily provide full EIA-708B functionality as soon as possible.

Conclusion

This country is facing an opportunity for the first time to build into an emerging technology equal access for people with disabilities. Equal access doesn't mean being able to use only the most basic and simplistic aspects of a service or device, but instead embraces the chance to have an equivalent experience. Digital television will be providing consumers with advanced pictures, sounds and ancillary services and will be giving them a multitude of equipment choices for how these services will be received and used – integrated receiver/displays, set-top boxes and personal computers. People who are deaf or hard-of-hearing should have similar access to so advanced a service with as many usage choices.

By requiring an advanced set of caption display features and by assuring that such features are available regardless of the digital TV equipment used, the Commission can make sure all members of society will be able to participate in this key development of the new Information Age.

Respectfully submitted,



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